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the complete typical formula, while the permanent dentition shows a very marked reduction. Also in *Lepidolemur*, in which all the superior permanent incisors are wanting, one incisor is preserved in the milk dentition.

"Almost without exception the milk teeth of the Lemurs are smaller and weaker than the corresponding permanent teeth. If the permanent dentition reaches a higher grade than the dentition it is explained by the fact, as I have already shown, that the latter has undergone a more or less pronounced differentiation in the size of its individual components; this is the case in *Tarsius*, *Indrisinae* and *Chiromys*, without in the least diminishing the original number of the teeth.

"So far as I have considered the phylogeny of the different teeth, whilst among the Insectivora and the mammalia of the secondary period, and in exceptional cases among the living forms such as the Marsupial *Choeropus* and the fossil *Paleochoerus*, canines are observed with double roots—a character which is certainly to be regarded as primitive—I have found in the Lemurs, both in the milk and permanent dentition, two-rooted canines. The fact that often a one-rooted milk canine is replaced by a two-root permanent canine, and this order in other cases is reversed, requires further clearing up.

"That an elongate or more premolar-like structure of the superior canine is the original form of this tooth in the Lemurs, appears to be evident in every case in which the permanent canine differs from the milk canine; for the milk tooth is always more like a premolar than the permanent tooth, as seen in the comparison of *Chirogaleus*, *Adapis* and *Tarsius*. A comparison of the canine of the old tertiary form, *Microchoerus*, with that of the modern *Tarsius*, lead us to the same results."

H. F. O.

CURRENT NOTES ON PHYSIOGRAPHY.

ORIGIN OF THE LAURENTIAN RIVER SYSTEM.

UPHAM continues his discussion of the great lake problem (*Amer. Geol.*, XVIII., 1896, 169–177), maintaining that during Tertiary time the Mississippi-St. Lawrence divide probably lay northwest of the Adirondacks, in this differing from Spencer, who regards the preglacial St. Lawrence as already an extensive river system. Certain general relations of our larger land forms and river systems would, however, seem to prove the extension of the preglacial St. Lawrence at least into the Ontario basin. All the Great Lakes, except Superior, lie along the inner lowlands, and are enclosed by the infacing uplands* of an ancient and greatly denuded coastal plain of paleozoic strata, whose oldland is the Laurentian highland. The great Appalachian valley is also an inner lowland, between the inface of the Alleghany and Cumberland plateau and the oldland of the Blue Ridge; but this inner lowland is complicated by the mountains that have been bent up and worn down along it. The normal drainage of both these regions would be from the oldland across the inner lowland and out through the scarped uplands to the Ohio or Mississippi. The Wisconsin and the Kanawha rivers are exceptional in still preserving this normal course. The Potomac, Susquehanna, Delaware and Hudson are all abnormal in flowing from the Alleghany plateau across the inner lowland and out through the oldland to the Atlantic. Now, as these abnormal courses had been attained in early Tertiary time, and perhaps sooner, it is not only possible, but probable, that a considerable part of the abnormal drainage area of the St. Lawrence had been developed much earlier than Upham maintains.

* The Spanish term *cuesta* might be used for this unnamed form. See Hill, *Nat. Geog. Mag.*, VII., 1896, 295.

THE EARTHQUAKE WAVE IN JAPAN.

THE recent earthquake wave on the northern coast of Hondo, the chief island of Japan, is vividly described with illustrations by E. H. Scidmore (Nat. Geogr. Mag., VII., 1896, 289). The wave reached the coast in the evening of June 15th, last. Most of the people were indoors on account of rain then falling, "when, with a rumbling as of heavy cannonading out at sea, a roar, and the crash and crackling of timbers, they were suddenly engulfed in the swirling waters." Only a few survivors on all that length of coast saw the advancing wave, one of them telling that the water first receded some 600 yards before the wave rose like a black wall 80 feet in height, with phosphorescent lights gleaming along its crest. "Ships and junks were carried one or two miles inland, left on hilltops, treetops, and in the midst of fields uninjured or mixed up with the ruins of houses." Where the coast was low and faced the open ocean, the wave washed in and, retreating, carried everything back with it. Where the wave entered a fiord or bay it bore everything along to the head of the ravine or valley and left the mass of *débris* in a heap at the end. On the open coast the wave came and withdrew within five minutes, while in long inlets the water boiled and surged for nearly half an hour before subsiding. Groves of large pines were cut down to short stumps; thick granite posts of temple gates were snapped off, and the stone cross-beams were carried 300 yards away.

GEOGRAPHICAL BIBLIOGRAPHY FOR 1895.

A GEOGRAPHICAL bibliography for successive years constitutes a supplement (5 fr.) to the five regular numbers of the *Annales de Géographie* (Colin, Paris, 25 fr.). The bibliography for 1895 is just issued with 1087 titles, the work of 49 co-laborers. It is arranged under the follow-

ing chief headings: history of geography, mathematical, physical, political geography and regional geography; this last being much further divided under subheadings of different countries. Brief notices are given of more important work, but with less detail than in Petermann's *Mitteilungen*. An index of authors cited occupies 23 columns. A three-hour cursory examination of such a work as this will guide most librarians to all the geographical works that they need order. A somewhat more careful examination will disclose many out-of-the-way essays to the scientific reader; for example, an article by Carton on '*Oasis Disparues*' (Rev. Tunis, 1895, 201), maintaining that the climate of Tunis has not changed since Roman times, that careless waste of water to-day contrasts with careful economy in ancient times, when reservoirs and canals fertilized the oases.

NOTES.

THE testimony of 'old residents' as to the reputed change in the range of vision in the Swiss Jura, supposed to be the result of earth movements, and given some credence by extended quotation in recent years, has been carefully examined on the ground by Jegerlehner, who doubts its sufficiency. He does not find the memory of untrained observers a sufficient argument to so remarkable a conclusion, and recommends the establishment of accurate measurements, which are probably now in progress (*Jahresber. Geogr. Ges. Bern*, XIII., 1894, 15-22).

FRÜH discusses the terminology of valleys in the Jura and Swiss Alps (*Zur Kritik einiger Thalformen und Thalnamen der Schweiz*, Viertelj. Naturf. Gesellsch., Zurich, XLI., 1896, 318-339). *Combe* applies to various forms, and is variously defined by such writers as Sonklar, Sievers and Reclus; and hence it does not deserve the specific meaning given to it by Desor.

Früh regards it as equivalent to *Kumm* and *Gummi* in the Alps, and to *Cwm* in Wales, and refers all these modern forms to an Indo-Germanic root, meaning valley, preserved to-day in rugged districts where the older races sought refuge from invaders. *Ruz*, *chuse*, and other terms are similarly discussed.

A CIRCULAR issued by Domenico Locchi, Via Cibrario, 47, Turin, Italy, describes a model of the morainic amphitheatre of Lake Garda, which he constructed on order of the *Scuola di Guerra* at Turin. It is highly spoken of by the commander of the school and by so competent a geological critic as Prof. Taramelli, of the University of Pavia. A photographic print of the model shows it to be a remarkably fine illustration of a great looped moraine. The cost of the model is 250 lire, boxing extra. Its horizontal scale is 1: 25,000; the vertical scale being $2\frac{1}{2}$ times larger; its dimensions are 1.70 by 1.60 m. A list of other models by the same artist may be had on application to him.

A REPORT on the erosion of English coasts made to the British Association (1895, 352-392) records an average annual recession of 5 feet 10 inches for 37 years on the clay coast of Yorkshire from Bridlington to Spurn Head. Piers built at Dover and Folkestone catch the drifting shingle, and thus deprive the cliffs beyond of their natural protection, making costly seawalls necessary. Besides several reports from local observers, there is a local bibliography.

CURRENT NOTES ON METEOROLOGY.

CLIMATE AND MAN.

THE word anthropo-geography has been coined to meet the need of a designation for that branch of geography which treats of the earth in its relation to man. The present rapid advance of climatology has in the same way rendered necessary the coin-

ing of a similar word which can be used to designate that aspect of this study which deals with the relations of climate and man. It is natural that the word *anthropo-climatology* should be chosen for this sub-division of our subject. The length of the term makes it rather clumsy, yet its advantages more than outweigh its disadvantages, and it is to be hoped that it may come into general use. Under anthropo-climatology we should include all the various relations that exist between climate taken in its broadest sense and man. The climatic control of habitability, of occupation, of colonization; the influence of climate in stimulating or controlling migrations, invasions, and the like; the immediate and permanent physiological effects of different degrees of temperature, humidity and pressure, etc.; the relation of climates to the distribution and prevalence of diseases; acclimatization, and other related matters may all find shelter in this subject of anthropo-climatology. To some extent also, in considering the medical or sanitary aspect of climatology, some account must be taken of soil conditions, of ground water, of drainage and other matters which are usually included under the head of hygiene. Anthropo-climatology thus considers subjects which belong in many other departments of learning. It embraces within its scope matters that come up also in meteorology, geography, medicine, hygiene, history, ethnology. At present this human side of climatology receives little attention, but it is certain to become a subject of increasing importance as time goes on. Its consideration belongs properly under climatology, and instruction in climatology of a university grade should lay more emphasis than it now does on these interesting and important relations of climate and man. The student of anthropo-climatology must gather his information from many sources. He must consult writings of all the subjects above mentioned as contributing to this